2008

Prototypical Implementation of an Intermediary Platform for Context-Sensitive Mobile Marketing Applications

Andreas Albers
Johann Wolfgang Goethe Universitat Frankfurt am Main, andreas.albers@m-chair.net

Christian Kahl
Johann Wolfgang Goethe Universitat Frankfurt am Main, christan.kahl@m-chair.net

Prototypical Implementation of an Intermediary Platform for Context-sensitive Mobile Marketing Applications

Andreas Albers
Goethe University of Frankfurt a.M.
andreas.albers@m-chair.net

Christian Kahl
Goethe University of Frankfurt a.M.
christian.kahl@m-chair.net

ABSTRACT

The mobile online medium (i.e. mobile data communication) allows the creation of context-sensitive Mobile Marketing applications by using identity- and context information and thereby enabling the efficient targeting of current user needs. However, existing concepts/implementations do not address the impacts of identity- and context information integration to marketing intermediary platforms which connect mobile users and advertisers. Therefore, this paper describes the latter impacts and documents how they can be considered when designing and implementing of a prototypical Mobile Marketing intermediary platform. Besides showing the feasibility of the concept, the foundation for conducting empirical research (e.g. user acceptance tests) about the young field of context-sensitive Mobile Marketing is provisioned.

Keywords

Mobile Marketing, Electronic Markets, Market Engineering, Prototyping, Intermediary Marketing Platform.

INTRODUCTION

Online Marketing campaigns carried out using the mobile medium (i.e. mobile data communication) are mostly subsumed under the term *Mobile Marketing* or *Mobile Advertising* (Leppaeniemi, Sinisalo and Karjaluoto 2006). Although, literature does not provide a common understanding regarding these terms, it is agreed that their unique features notably contribute to the benefits of online marketing applications (Barwise and Strong 2002, Salo and Taehtinen 2005, Wohlfahrt 2001). Therefore, the mobile network offers the ability to distinctly identify its mobile users, as well as to determine their current location and time of usage (Figge and Theysohn 2006). If applicable, by enriching this information with provided user profiles and integrating those into a *context-sensitive mobile user profile*, the prerequisites for the Permission- and One-to-One Marketing paradigm (Barwise and Strong 2002, Peppers and Rogers 1997) are provisioned. In addition, the ability to establish a location- and time independent communication between mobile users and advertisers (Decker, Bulander, Hoegler, and Schiefer 2006) provides the foundation for high efficient promotional Mobile Marketing applications.

Examining the current Mobile Marketing market, basically two types of Mobile Marketing implementations can be found:

- *Text message based advertisements (Push/Pull)*. Advertisers either send text messages to the mobile phone of users (Push) or are using other media such as TV, radio, print, or On-Pack promotions (Pull) in order to have the user initiate the communication by himself. The targeting occurs mainly based on in advance collected user profiles (Push) or based on the content provisioned for the user (Pull) (Lippert 2004).
- *Text/Banner advertisements on mobile websites (Pull)*. Like in the stationary internet, text/banner advertisements are displayed on mobile websites. Targeting is mainly implemented based on the content of a mobile website (AdMob 2008, Screen Tonic 2008).

Identity- and Context Information in Mobile Marketing Applications

The outlined potential of the mobile medium to acquire and apply identity- and context information, allows the offering of Mobile Marketing according to a users' *current needs* and *situation*. These kind of applications are typically user initiated (current need), make use of an existing user profile (user identity) and the current user's situation (current location and time of usage) in order to target Mobile Marketing activities (Decker et al. 2006, Roesch 2006). A typical scenario in this context is to provide a potential mobile user, searching for a restaurant, with a list of all registered restaurants on his mobile device,

which are in his close proximity (current location), have compliant opening hours (time of use) and match his food preferences (identity). Whereas context information can directly be retrieved from the mobile network, identity information, in the sense of this paper, represents marketing related user profile data (e.g. gender, age, basics interests, etc.) which has to be acquired in two steps. First, the mobile network detects the unique ID of a subscriber (i.e. MSISDN) and then the beforehand stored user profile corresponding to the user ID is queried from a database.

To date, there are several academic research approaches integrating identity- and context information into Mobile Marketing applications. The MoMa System (Bulander, Decker, Schieferand and Koelmel 2005), the SMMART System (Kurkovsky and Harihar 2006) and Freezones (Figge 2007) compare context-sensitive user profiles and advertiser' target group definitions rule-based and present the user with relevant matches on his mobile device. The user is then able to choose from relevant advertisements. The Ad-Me System (Hristova and O'Hare 2005) functions in a similar way, but additionally incorporates the fees paid by the advertiser into the matching process. Tripathi (2003) presents decision models for wireless advertising companies optimizing the delivery time of text message-based context-sensitive promotional messages as well as their pricing from a providers' perspective. Finally, the E-LBA project (E-LBA 2003) developed a location-based advertising system which targets the communication with recipients based on their current location but not necessarily using further context information provided by the mobile network.

The mobile applications, that currently exist in the market and which take advantage of available identity- and context information from the mobile network, can be roughly divided in two classes:

- "Finder" applications such as Google Maps (2008) or i-area (i-mode 2008) supporting a user to find close-by Point-Of-Sales (POS) by filtering those at farer distance.
- Ad-sponsored Mobile Communities such as Qiro (2008), Loopt (2008), Gypsii (2008) or MyRimis (Nanomatic 2008) which take advantage of available identity- or context information in order to target advertisements for their members.

While identity- and context information are often loosely and isolated integrated into current applications, the increasing competition in the mobile market (Google 2008, Yahoo 2008, Enpocket 2008, Ad Mob 2008, Screen Tonic 2008) indicates that Marketing intermediary platform providers will soon be forced to improve the personalization of their mobile services (user side) as well as increase the efficiency of Mobile Marketing campaigns (advertiser side) in order to survive. Consequently, a holistic integration of identity- and context information into Mobile Marketing intermediary platforms is required.

Mobile Marketing Platforms in a Two-sided Market

Mobile Marketing applications are typically organized as *two-sided markets* centered around an intermediary platform provider in order to match potential mobile users with relevant advertisers. On the one market side, the intermediary attracts mobile users with content and services while on the other market side, the attracted *eyeballs* are sold to the advertisers (Hagiu and Schmalensee 2006). Most prominent examples for such institutions in the stationary and mobile internet are search engine providers such as Google (2008b) or Yahoo (2008).

However, current Mobile Marketing intermediary platform providers are only focusing on how to target specific marketing activities (e.g. advertisements) based on available identity- and context information (intermediary – mobile user relationship). Thereby, they disregard the (especially pricing related) impacts of this additional information when trading eyeballs to the appropriate advertisers (see figure 1).

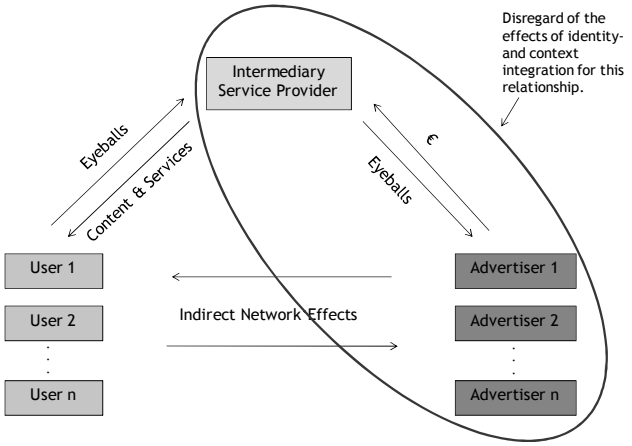

Figure 1. Two-sided (mobile) media/marketing market

These issues in the relationship between intermediary and advertisers for the context-sensitive Mobile Marketing applications have already been addressed by Figge (2007). He analyzed mobile network operators in the role of a Mobile Marketing intermediary platform provider, but specifically focused on how mobile network operators can apply their strategic advantages in this context rather than addressing which the specific impacts identity- and context information had. Further, Albers (2007) presented a theoretical design requirements framework and process model for designing context-sensitive Mobile Marketing intermediary platforms, but without considering the design of an architecture for an platform application implementation.

The objective of paper at hand is to describe the main impacts of identity- and context integration to Mobile Marketing applications in a two-sided market for the intermediary – advertiser relationship (as shown in figure 1) and demonstrate how a context-sensitive Mobile Marketing intermediary platform can be prototypically implemented. Besides proofing the technical feasibility of such kind of marketing measures, the foundation for further empirical research (e.g. user acceptance) in this young field can be provisioned. Hence, the remainder of this paper is organized as follows. The next chapter will give a brief overview of the main impacts of identity- and context integration to Mobile Marketing applications in order to provide the foundation for gathering the requirements of the platform application. Afterwards, the electronic market design framework of Weinhardt, Holtmann and Neumann (2003) is introduced in order to avoid the violation of general market design requirements. Using this framework, the main platform design requirements are discussed and the implemented platform application architecture and related processes are presented.

IMPACTS OF IDENTITY- AND CONTEXT INTEGRATION INTO MOBILE MARKETING APPLICATIONS

In the stationary internet typically intermediary platform providers such as Yahoo or Google only know an entered *keyword* or the *visited website* about a user. Advertisers acquire these user profiles or contacts respectively by participating in real-time auctions for virtual advertising space (keyword auctions) on the intermediary platform or by paying a fixed amount to be listed on a specific website (Varian 2006).

With the availability of identity- and context information for those user profiles in the Mobile Marketing domain, the following main impacts to the previously discussed two-sided market are recognized:

- Advertisers will no longer target advertisements for large customer groups segments (e.g. solely based on keywords). Mobile users become unique (due to their distinct location, time of use a personal preferences) and thereby can and have to be addressed individually (Peppers and Rogers 2002).
- Location-related advertisements will have a higher possibility of disturbance if the message is irrelevant to a user in a mobile environment (e.g. a mobile user walks to an advertised restaurant that turns out to be closed; leaving an irrelevant website takes only a hit on the internet browsers “Back-Button” in the stationary internet).
- Matching complex context-sensitive mobile user profiles with advertisers’ target group definitions requires increased computing performance in order to ensure real-time processing and delivery of advertisements to the users’ mobile device.

- An intermediary's IT-infrastructure needs to be able to acquire and process context information from multiple sources. (e.g. location information via Cell-of-Orgin, GPS, WiFi, etc.) (Albers, Radmacher and Figge 2005).
- The quantity and quality of available identity- and context information about a mobile user may vary considerably (e.g. due to privacy concerns of a user revealing his location (Ng-Kruelle et al. 2002) or due to technical restrictions (e.g. no GPS device available).
- Dynamic context information such as a *user's current location* or *time of use* is new to advertisers. The evaluation of the potential of mobile recipients based on such information is difficult and requires new methods or approaches (Figge and Theyson 2006).
- The use of personal data raises the possibility of potential privacy concerns of users (Bauer, Barnes, Reichardt and Neumann 2005) which need to be addressed.
- Matching mobile users and advertisers based on personal (interest) profiles requires a common understanding between intermediary, advertiser and user about the semantics of the contained attributes (e.g. gender, education, age, hobbies, etc.) in these profiles (FIDIS Project 2007).

DESIGN OF AN ELECTRONIC MARKET PLATFORM FOR MOBILE USER PROFILES

The previously named impacts of identity- and context information have to be addressed when implementing a prototypical Mobile Marketing intermediary platform application. Therefore, the market framework of Weinhardt et al. (2003) is used to guide the design process. This framework was specifically chosen because it does not isolated address the allocation process while assuming a perfect market. Instead technological, legal, socio-economic and business aspects which are highly relevant especially for the mobile market are covered as well (Neumann 2007). In addition, based on this framework, the meet2trade research project implemented a generic tool suite allowing designers to configure electronic markets according to their individual needs (meet2Trade 2005)

Electronic Market Design Framework and Process Model

At first, the electronic market design framework of Weinhardt et al. (2003) shows an electronic market to be mainly affected by the *technological*, *social-economical* and *legal environment* which cannot be influenced by the market designer. The tasks of the designer are, based on the described aspects, to map the characteristics of the *transaction object* into the electronic market (i.e. enabling its trading) and to model the *transaction services* – which at least influences the behavior of the market participants (see figure 2).

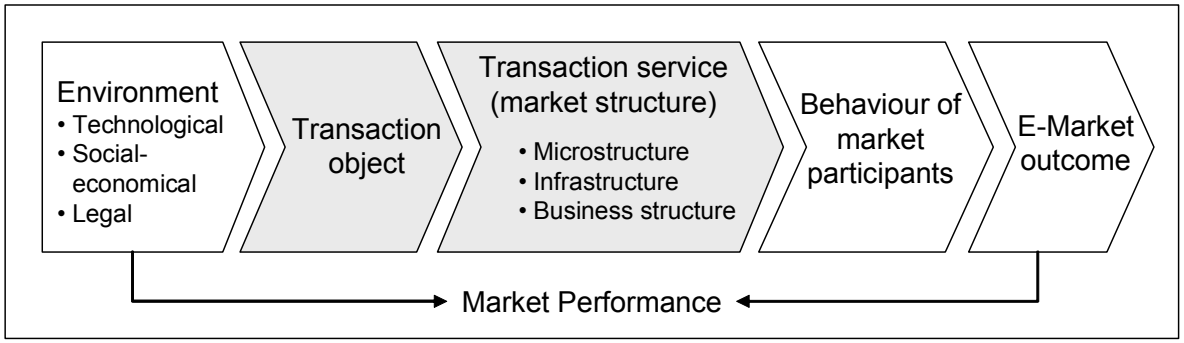

Figure 2. Framework for creating an electronic market based on Weinhardt et al. (2003)

The *transaction object* and *market structure* (consisting of market microstructure, infrastructure and business structure) are developed adapted from an iterative process model depicted in figure 3. It begins with the identification of the stakeholders (phase 1), followed by the conduction of a requirements engineering (phase 2). Based on the latter, the mapping of the transaction object on the electronic market takes place (phase 3). Subsequently, the transaction service (market structure) is developed (phase 4) and afterwards implemented/tested (phase 5). Finally, the implementation is rolled out for operation (phase 6).

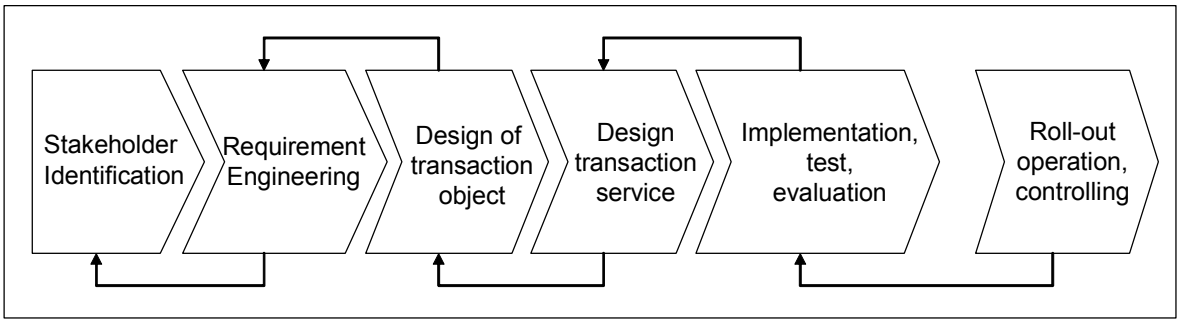

Figure 3. Market Engineering process based on Weinhardt et al. (2003)

The actual design requirements for the transaction object (i.e. the context-sensitive mobile user profile) and transaction service (i.e. provision of an advertisement to mobile website) will be described in the following chapters.

Design of Transaction Object

The product *context-sensitive mobile user profile* (transaction object) constitutes a digital dataset which stores all acquired information about a mobile user at the time of its creation. In order to make the mobile user profile a tradable object, the following requirements need to be met:

- A common understanding for this object between advertisers, platform provider and mobile users needs to be established. This provides consistent communications between advertisers and the platform provider (matching of user profiles and target group definitions) and between the platform provider and mobile users (for maintaining the sharing of personal information due to privacy reasons). Depending on the number of attributes, the introduction of a common attribute catalog or ontology could accomplish this task (Figge 2007).
- The mobile user profile needs to be extendable for new attributes and it should be able to deal with varying quantity and quality of these identity- and context information.

Design of Transaction Service

Based on the discussed impacts of identity- and context information, the following application requirements can be addressed:

- Because context-sensitive mobile user profiles are unique to each advertiser, an intermediary platform provider needs to introduce price discrimination for such profiles in order to maximize his profits. Since only advertisers know the true value of a user profile, a dynamic interactive pricing mechanism (e.g. auction) is required in order that they reveal their willingness-to-pay (Noussair, Robin and Ruffieux 2004).
- Due to the increased risk of disturbing a user with irrelevant advertisements (Feldmann 2005, Meier 2002), a Mobile Marketing intermediary platform provider needs to evaluate the bids of advertisers participating in an auction for virtual advertising space. If applicable, the intermediary platform provider should weight them in order to ensure a specific level of relevance between advertisers and user. For instance, Google uses the click-rate of advertisements as a measure for weighting advertisers' bids (Google 2008).
- Because of more required computing power when matching mobile users and advertisers, the intermediary platform provider needs to be able to limit the number of participating advertisers in order to ensure the real-time processing of the transaction service. A preferred economic method here could be the introduction of participation fees (i.e. auction reserve price) for advertisers (Klemperer 2002).
- New dynamic information (e.g. user location) requires the provision of advertisers with an evaluation tool to select those potential mobile users with the highest business relevance for their advertisements.
- Mobile users need to be provided with an Identity Management System in order to conveniently manage the personal user profile or restrict the revelation of specific types of information (e.g. their current location).

PROTOTYPICAL IMPLEMENTATION OF A MOBILE MARKETING INTERMEDIARY PLATFORM

As it has been outlined before, models like those by Albers (2007) or Figge (2007) show, how identity- and context information may be used for appropriate personalized Mobile Marketing applications. Based on the framework by Weinhardt et al. (2003), it has furthermore been shown how to construct the respective electronic market and how to design the associated transaction objects, in this case context-sensitive mobile user profiles. Against this theoretical background and the consecutively derived application requirements, a prototypical application has been developed, which implements a Mobile Marketing intermediary platform application. This prototype is subject of the following section.

Usage Scenario

The prototype realizes an electronic market platform for the creation, trade and usage of context-sensitive mobile user profiles and enables services for advertisers with different targets and target groups, users with different profiles, locations and interests as well as an intermediary connecting both of them. Therefore the design of the prototype consists of three main applications, representing this three mentioned parties, and it is derived from their relationships and the subsequent usage flow as depicted in figure 4.

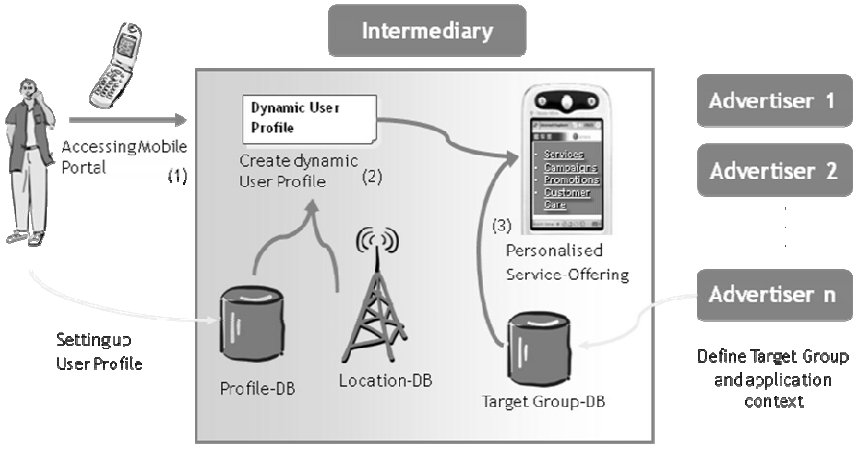

Figure 4. Prototype Concept (Pull Scenario)

Initially, an advertiser (e.g. a restaurant owner) and a mobile user register their selves with the Intermediary Platform. The advertiser has the option, to configure target groups, which represent characteristics of the targeted customer, e.g. preferred age, interests, or location. The user on the other side creates a personal profile, which contains a particular set of personal information, such as some general information about his person (age, gender, etc.) and some more specific information about his interests (e.g. pizza, movies). Both profiles are stored and administrated by the intermediary platform provider, who uses them, to process the matching between advertisers and users.

In the first step of the matching process a user accesses the intermediaries' mobile portal, by using his mobile device e.g. a mobile phone. Based on the information he has deposited in his profile before, a dynamic user profile is now generated in step 2. That profile contains, in addition to the static information about the user, like age or general interests, dynamic information like the current time and the users' location. After its creation, in step 3, the intermediary matches the dynamic user profile with target groups defined by various advertisers, resulting in values, which express the degrees of accordance. On this basis each user (profile) may now be priced and auctioned to bidding advertisers individually. Finally, the intermediary provides their advertisements to such adequate users.

The three-step process of matching user profile, context information and advertisers target groups at the intermediary, is basically the same for a push and a pull scenario. With the relevant difference, that in a push scenario the user is tracked by the intermediary. In consequence the matching is not performed upon a user request (as in a pull scenario) but continuously, to inform him immediately, when there is a relevant location to be advertised to him at a particular time. Such a personalized service offering would then be pushed directly to the users' mobile device.

Goals

One of the main goals behind the prototype development is, to show how a mobile marketing approach such as the one described by Albers (2007) can be implemented. The prototype is intended to demonstrate the use and potentials of context based user profiles with focus on a dynamic pricing mechanism for such profiles. Especially it should serve to show the roles of the involved parties, and the possible benefits in context of the relationship between intermediary and advertiser.

Interfaces and Functionality

The developed prototype application completely supports the described usage sequence, under consideration of the respective previously derived application requirements. Consequently it consists of three main parts, dedicated to the related parties user, advertiser and intermediary.

User

A user may access the portal via a web interface on his mobile device. After he has logged himself into the service, the user starts with an overview site, where it is possible to adjust the service to some degree, according to his interests and needs. For example, a user can specify that he likes Italian cuisine (interest) and feels hungry (need) at the moment. To find locations, which serve his needs and are appropriate to his interests, and which may therefore be potentially attractive to him, the user has several options. In the prototype he can choose from a few given exemplary categories, in the described case e.g. restaurants. The categories are separated by the types "Search & Find" and "Content". With the selection of a category starts the internal process of matching, as described before. Resulting from this process, the user directly gets one or more recommendations of the specified category (in case of "Search & Find") or respectively relevant content (in case of "Content"), e.g. weather news. Regarding the restaurant example, he would get a list of Italian restaurants (interest), which are within a certain distance to him (location) and which are currently opened (time). It should be emphasized here, that the chosen categories (restaurants, pharmacies, etc.) represent only examples for areas in which a user might be interested, while being en-route. There are undoubtedly a lot more categories, on which the scenario might be expanded to (see figure 5).

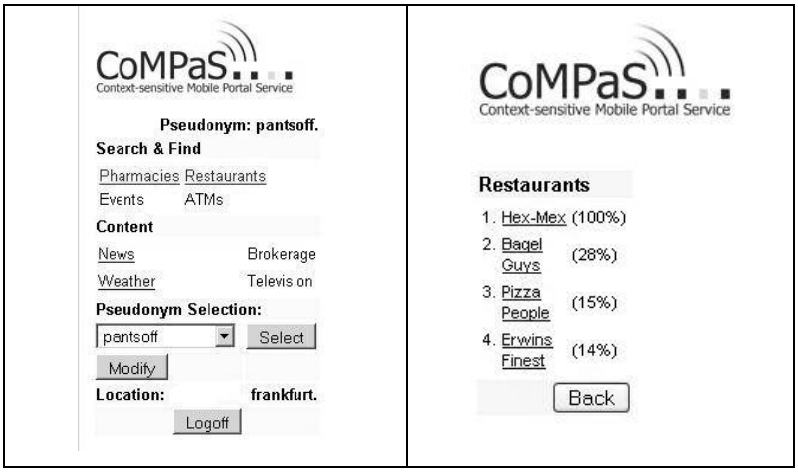

Figure 5. Mobile Portal Web Interface

In addition to the selection of categories of interest, a user may further personalize his profile by selecting a pseudonym, which is associated with a set of general interests and personal, situation specific needs. This set of information constitutes the fundament of his user profile. Another part of this profile are a number of privacy settings, the user is allowed to adjust. They comprise the allowance or disallowance of push activities, localization, and identification as well as the possibility to enable or disable the whole user profile (see figure 6).

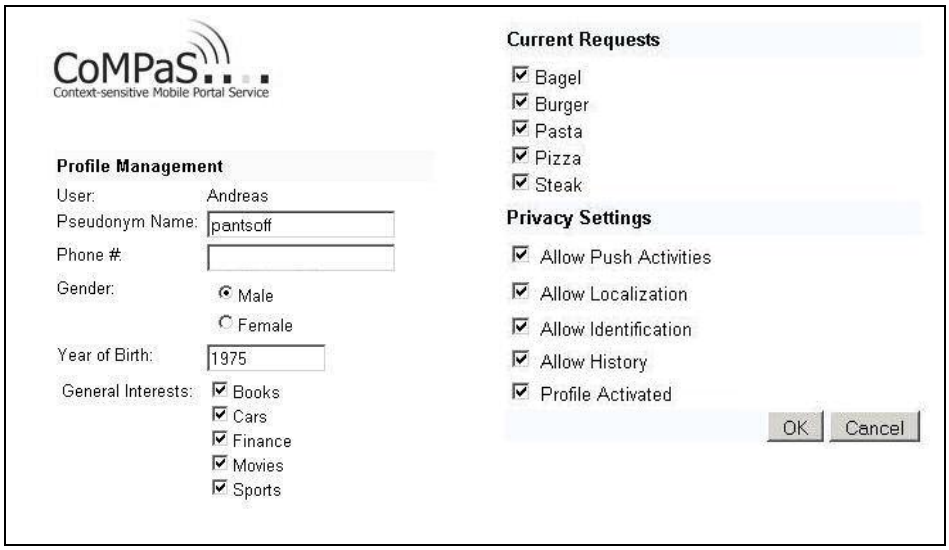

Figure 6. Mobile User Profile and Privacy Settings

Advertiser

To represent the role of an advertiser, the prototype consists of a separate second tool, which is used to define and control marketing activities. The advertiser tool consequently allows at first, to define marketing activities in various categories, in this prototype such as Marketing e.g. for Restaurants or Pharmacies. Within one of those marketing activities an advertiser may be defined, and described by a number of different specifications. They comprise some general information, like opening times, a marketing budget per customer and the location of the Point of Sale (POS). In addition to this information about an advertiser, the targeted customer group (customer profile) may be defined, in detail by properties like the preferred gender(s), the focused age spectrum, and the interests. Regarding the mentioned example again, an Italian restaurant could describe and limit its target group here to users, which are interested in Pizza or Pasta. A further containment of the target group can be reached by adjusting the filtering of users, e.g. to specify, users up to what distance to the POS, within what time (depending on the opening times) and with which requests are principally relevant. Such kind of filtering serves as a mechanism, to limit the target group by ruling out advertisers and customers from being part of a matching process, who fulfill certain criteria. Referred to the example again, filtering would be useful to exclude an advertiser who sells Burgers, whereas the customer request is Pasta and in consequence there is no matching needed at all. Finally, the weight of the parameters, which influence the matching process, may be specified in the advertiser tool of the prototype. These parameters contain, consumer profile, location, request time and identity parameter. All of them can be weighted to a certain degree, to set up their relevance and influence in the matching process context (see figure 7).

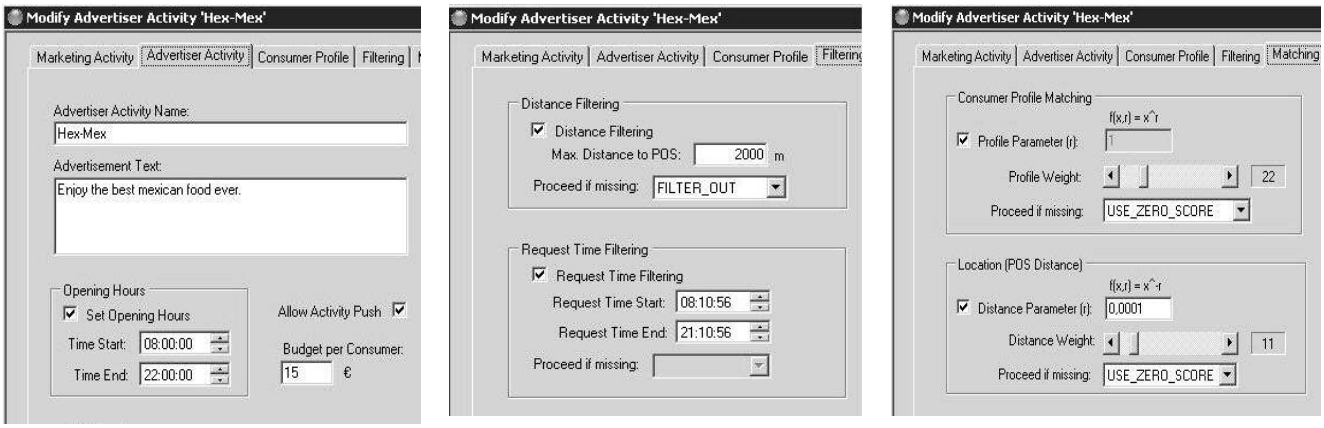

Figure 7. Selected Interfaces of the Advertiser Tool

Next to defining, the Advertiser Tool of the prototype also possesses a component for controlling the marketing activities. This component provides a log, where every processed transaction is listed. Including the transactions' date, the advertiser bid, advertisers matching and information about the user, like his location and pseudonym.

Intermediary Platform provider

For the representation of the Intermediary, who arranges the connection between user and advertiser, a third tool is part of the prototype. The intermediary tool allows to define and modify categories of marketing activities (e.g. marketing activities for restaurants), from an intermediaries' perspective. Hence, for each of these categories some basic data may be adjusted, e.g. categories of consumer interests, as well as the selection of a payment type and a pricing mechanism for the dynamic user profiles. The options in this case comprise different auction variants and also static pricing. Additionally, for each category it is possible to define fictive advertisers and users for testing purposes. Furthermore, components for controlling and monitoring activities and for performance testing are available, to evaluate the success of particular marketing activities and adapt them, if necessary (see figure 8).

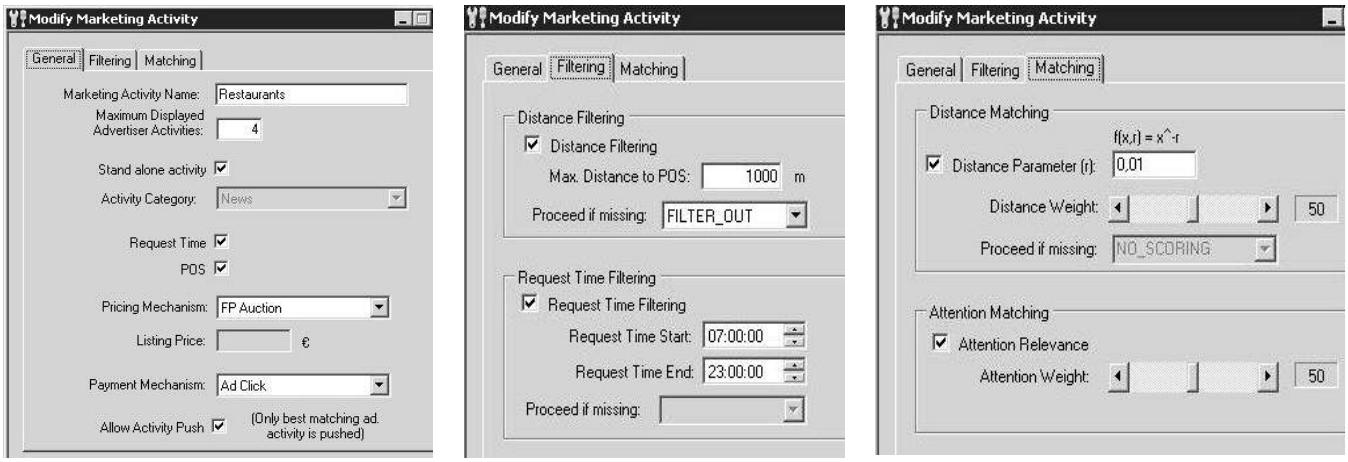

Figure 8. Selected Interfaces of the Intermediary Tool

Architecture

The underlying technical architecture of the described prototype application is once again structured into three parts, in analogy to the three acting parties. Common fundament of this architecture is a database, which contains all data, needed to

realize the various services that are provided for each party. The prototype services are aggregated in one component (Prototype Services) and accessed by several graphical user interfaces, for advertisers, users and the intermediary. Regarding the user, next to the mobile interface, he may additionally use services via a web interface and an SMS interface, to enable push SMS as a further mean of mobile marketing and advertising activities (see figure 9).

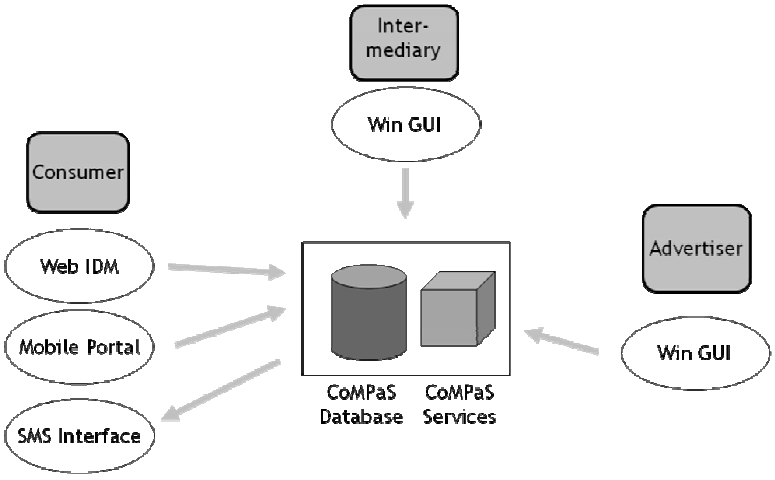

Figure 9. Prototype Architecture

Implementation

For the implementation of the prototype architecture, a combination of different technologies has been used. The architecture consists of three layers, for data, application logic and presentation. As basis serves the Microsoft Internet Information Server, with a Windows Server 2003 operating system. On the database layer a database in MS Access format was used, whereas the application logic and the common functionality have been implemented in a .NET 2.0 environment. On top of this infrastructure, the Graphical User Interfaces where developed with ASP.NET (regarding web based elements) and WinForms (for Windows GUIs) (see figure 10).

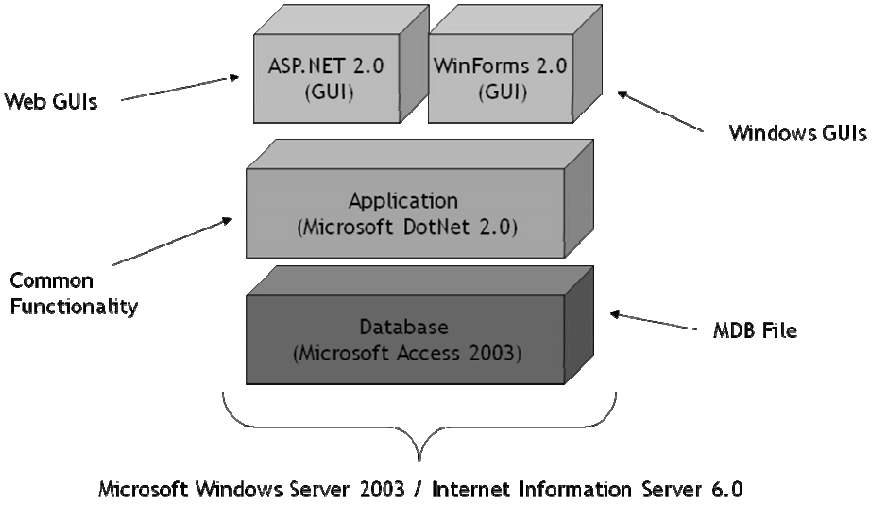

Figure 10. Technical elements of the Prototype

CONCLUSION AND FUTURE WORK

The paper at hand briefly discussed the impacts of identity- and context information integration into Mobile Marketing applications. Considering the latter impacts, the electronic market framework of Weinhardt et al. (2003) was used, to support the development of a prototypical Mobile Marketing intermediary platform application. This demonstrated the feasibility of

implementing Mobile Marketing platforms while explicitly addressing the impacts of identity- and context information integration.

At the same time, this highly customizable application provides the foundation for future empirical tests. In detail several objectives should be addressed here. First, an empirical user trial should be developed, in order to exploit the willingness of users to reveal personal information in exchange for personalized services and marketing activities. In the next step, it is necessary to verify if advertisers gain an added value from such a system for their marketing activities. Due to the innovative nature of this approach, it is planned to conduct expert interviews in order to cover this task. Finally, it needs to be tested, how the complex matching mechanisms and auction processes scale up to a huge number of users, by using a simulation approach.

The empirical tests should lead to a better insight into this young but promising approach of distributing and targeting marketing activities via the mobile medium. and thereby deliver a valid basis for future implementations of context-sensitive Mobile Marketing.

REFERENCES

1. AdMob (2008) Mobile Web Advertisements, *http://www.admob.com*, last access 2008-02-15.
2. Albers, A., Figge, S., and Radmacher, M. (2005) LOC^3 - Architecture Proposal for Efficient Subscriber Localisation in Mobile Commerce Infrastructures, *Proceedings of 2nd IEEE International Workshop on Mobile Commerce and Services (WMCS'05)*, Munich, Germany.
3. Albers, A. (2007) An Electronic Market Framework for context-sensitive Mobile Consumer Profiles in the Marketing Domain, *Proceedings of the 13th Americas Conference on Information Systems*, August, Keystone, Colorado, USA.
4. Barwise, P., and Strong, C. (2002) Permission-based mobile Advertising, *Journal of Interactive Marketing*, 16, 1, 14-24.
5. Bauer, H., Barnes, S., Reichardt, T., and Neumann, M. (2005) Driving user acceptance of Mobile Marketing: A theoretical framework and empirical study, *Journal of Electronic Commerce Research,* 6, 3, 181-192.
6. Bulander, R., Decker, M., Schiefer, G., and Koelmel, B. (2005) Enabling Personalized and Context Sensitive Mobile Advertising While Guaranteeing Data Protection, *Proceedings of the EURO-mGOV*, Brighton, UK.
7. Decker, M., Bulander, R., Hoegler, T., and Schiefer, G. (2006) m-Advertising: Werbung mit mobilen Endgeraeten - Ein Ueberblick, *Proceedings of 1st Fachtagung 'Mobilitaet und Mobile Informationssysteme'*, Passau, Germany.
8. Enpocket (2008) Mobile Advertising and Mobile Marketing Services, http://www.enpocket.com, last accessed 2008-02-15.
9. E-LBA (2003) European Location-based Advertising, *http://www.e-lba.com*, last accessed 2008-02-15.
10. Feldmann, V. (2005) Leveraging Mobile Media, Physica-Verlag, Heidelberg/New York.
11. FIDIS Project (2007) Collection of Topics and Clusters of Mobility and Identity – Towards a Taxonomy of Mobility and Identity, Deliverable D11.1, *http://www.fidis.net*, last access 2008-02-15.
12. Figge, S. (2007) Innovatives Mobile Marketing - Kontextabhaengige Kundenansprache mit Hilfe mobiler Portale, *Kovac Verlag,* Hamburg, Germany.
13. Figge, S., and Theysohn, S. (2006) Quantifizierung IKS-basierter Marktleistungen: Analyse eines werbefinanzierten Geschaeftsmodells im Mobile Commerce, *WIRTSCHAFTSINFORMATIK*, 48, 2, 96-106.
14. Google Inc. (2008) Google Maps, *http://maps.google.com*, last access 2008-02-15.
15. Google Inc. (2008b) Google Inc., *http://www.google.com*, last access 2008-02-15.
16. Gypsii (2008) Gypsii Weptop, *http://www.gypsii.com*, last access 2008-02-15.
17. Hagiu, A., Schmalensee, R. (2006) The Economics of Software Platforms: An Application of Theory of Two-Sided Markets, in G. Illing and M. Peitz (Eds.) *Industrial Organization and the Digital Economy*, MIT Press, Cambridge, MA.
18. Hristova, N., and O'Hare, G.M.P. (2005) Ad-me: Wireless Advertising Adapted to the User Location, Device and Emotions, *Proceedings of 37th Hawaii International Conference on System Sciences*, Hawaii, USA.
19. i-mode (2008) i-area Service, *http://www.nttdocomo.com/services/imode/related/index.html*, last accessed 2008-02-15.
20. Qiro GmbH (2008) Qiro, *http:// www.myqiro.de*, last access 2008-02-15.
21. Klemperer, P. (2002) What really matters in auction design, *The Journal of Economic Perspectives,* 16, 1, 169-189.

22. Kurkovsky, S., and Harihar, K. (2006) Using ubiquitous computing in interactive mobile marketing, *Pers Ubiquit Compt,* 10,1, 227-240.
23. Leppaeniemi, M., Karjaluoto H., Sinisalo, J., and Salo, J. (2006) International Advertising and Communication: Integrated marketing communications in mobile context, Deutscher Universitaetsverlag, Wiesbaden, Germany.
24. Leppaeniemi, M., Sinisalo, J., and Karjaluoto, H. (2006) Mobile Marketing Research 2000-2005: Emergence, Current Status, Future Directions, *Proceedings of the CMC 2006 - 11th Conference on Corporate and Marketing Communications*, Ljubljana, Slowenia.
25. Lippert, I. (2004) Innovatives Marketing: Mobile Marketing, *Fritz Knapp*, Frankfurt, Germany.
26. Loopt (2008), Loopt, *http://www.loopt.com*, last accessed 2008-02-15.
27. Meet2Trade (2005), *http://www.meet2trade.com*, last accessed 2008-04-21.
28. Nanomatic Ltd. (2008) MyRimis, *http://www.myrimis.com*, last accessed 2008-02-15.
29. Neumann, D. (2008) Market Engineering - A Structured Design Process for Electronic Markets, Karlruher Universitätsverlag, Karlsruhe, Germany.
30. Noussair C., Robin S. and Ruffieux B. (2004) *Journal of Economic Psychology*, 25, 6, 725-741.
31. Ng-Kruelle, G., Swatman, P., Rebne, D., and Hampe, F. (2002) The Price of Convenience: Privacy and Mobile Commerce, *Proceedings of 3rd World Congress on the Management of Electronic Commerce*, Hamilton, Ontario, Canada.
32. Meier, R. (2002) Generierung von Kundenwert durch mobile Dienste, *Deutscher Universitäts-Verlag*, Wiesbaden, Germany.
33. Peppers, D., and Rogers M. (2002) The one to one future, Doubleday, New York, USA.
34. Roesch, B. (2006) Auf dem Weg zum Mobile Marketing 2.0, *ONEtoONE,* 7, 1, 8-13.
35. Salo, J., and Taehtinen, J. (2005), Advances in Electronic Marketing: Retailer Use of Permission-Based Mobile Advertising, *Idea Publishing*, USA/UK.
36. Screen Tonic (2008) Mobile Web Advertisments, *http://www.screentonic.com*, last access 15-02-2008.
37. Tripathi, A. (2003) Decision Models in Wireless Advertising, University of Connecticut, Connecticut, USA.
38. Varian, H. (2006) A theoretical and empirical analysis of the ad auction used by Google and Yahoo. *International Journal of Industrial Organization.*
39. Weinhard, C., Holtmann, C., and Neumann, D. (2003) Market Engineering, *WIRTSCHAFTSINFORMATIK,* 45, 6, 635-640.
40. Wohlfahrt, J. (2001) Mobile Commerce: Wireless Advertising, Gabler, Wiesbaden, Germany.
41. Yahho (2008) Online Marketing from Yahoo!, *http://searchmarketing.yahoo.com*, last access 15-02-2008.